

Notes on the Status of *Troides hypolitus* (Cramer) 1775 (Lep.: Papilionidae: Troidini) with a Description of a New Genus, Notes on the Status of *T. hypolitus cellularis* Rothschild 1895, and the Apparent Dimorphi in the Male Sex of *T. hypolitus sulaenis* Staudinger 1895

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The peculiar species *Troides hypolitus* Cramer stands, due to its numerous specialised characters, in an isolated position amongst the Birdwing Butterflies in the east. In spite of a superficial resemblance to the genus *Troides* Hübner, we have found that it has strong affinities to *Trogonoptera* Rippon. Our observations in this respect agree well with those of Zeuner 1943, who remarked upon the equally isolated positions of *hypolitus* and *Trogonoptera*, and who expressed some dissatisfaction over the position of *hypolitus* in the genus *Troides* Hübn. We find that the characters of *hypolitus*, though distinct, are in some ways intermediate between *Troides* and *Trogonoptera*, thus partially bridging the gap between these genera. The large number of distinct and highly specialised characters of *T. hypolitus* necessitates and justifies its elevation to generic status. The natural arrangement of the Birdwing genera is then as follows:

1. *Ornithoptera* subgen. *Ætheoptera* Rippon 1894
Boisduval 1832 subgen. *Ornithoptera* Boisduval 1832
subgen. *Schoenbergia* Pagenstecher 1893
2. *Trogonoptera* Rippon 1889
3. *Ripponia*, monobasic gen. nov. with type species *hypolitus* Cram. 1775
4. *Troides* Hübner 1819

It is apparent that the genera *Trogonoptera*, *Ripponia* and *Troides* have stronger affinities respectively than do *Ornithoptera* and *Trogonoptera*, though *Trogonoptera* also exhibits melanism and iridescent scaling. It is also apparent that the *Trogonoptera* and *Ripponia* are much more specialised than *Troides*. The geographical distribution of these genera is particularly interesting in this respect. There is an overlap of *Ornithoptera* and *Ripponia* in the Moluccas, while *Troides* overlaps geographically with both *Trogonoptera* and *Ripponia* throughout their ranges. Thus *Trogonoptera* and *Ripponia* are true allopatric genera with distributions extending respectively in the following areas:—

(1) *Trogonoptera*. Areas in the Malay Peninsula: Sumatra, Simeulue, Riow Lingga. Natuna Group: Borneo, Balabac, Palawan.

(2) *Ripponia*. Talaut Group: Banggai, Sulawesi (Celebes). Sula Group: Saparoea, Ambon, Buru, Ceran, Helmaheira, Morty.

The geographical distribution (with *Trogonoptera* peculiar to the Malay area and *Ripponia* replacing it in Celebes (Sulawesi) and the adjacent Moluccan islands to the east) does appear to support Zeuner's theory that they are descendants of the same ancestral stock, having both later independently acquired different modifications and specialisations—such as the melanistic characters and iridescent wing-scaling of *Trogonoptera*, and the satiny white scaling and modified flight of *Ripponia*.

The characters that distinguish *Ripponia* from the allied genera are as follows: (1) Specialised characters of venation (vein 8 of hindwing shorter than half the length of wing (fig. 1a): vein

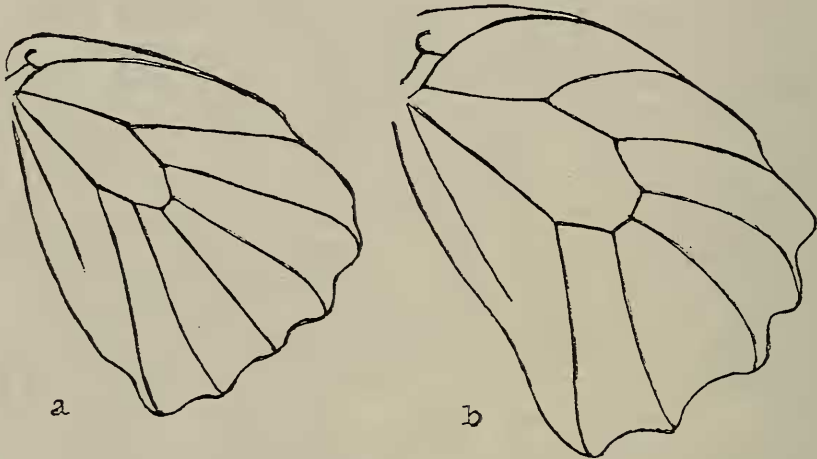
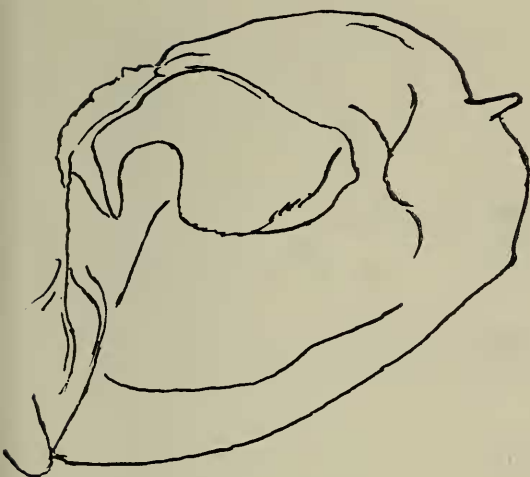


Figure 1: Simplified diagram of venation of male hindwing: (a) *Troides helena cerberus*, N. India. (b) *Ripponia (Troides) hypolitus hypolitus*, Ambon.

7 rising very steeply to the costal margin in a regular curve). (2) Specialised characters of scaling and pattern (male hindwing with a discal row of spots present: male/female hindwing without golden scaling inside cell: the golden scaling restricted to a row of submarginal spots) (for the scaling, see below). (3) Specialised characters of abdominal pattern and colouration (see below). (4) Genitalia of male sex (very distinct and only vaguely reminiscent of *Trogonoptera*: it has no resemblance to the *Troides* genitalia, and only a vague superficial resemblance to the genitalia of certain primitive forms of *Ornithoptera*) (figs. 2a, 2b, 2c). (5) Modifications of the dorsal fold in male, and of dorsal margin in female. These structures are described below. (6) Modifications of sexual dimorphism. (7) Structures of early stages (the dark larva differs somewhat from *Troides* larvae: a detailed description of the early stages was published by Straatman (1968). The pinkish-grey pupa differs from *Troides* pupae in colouration and markings, in having broadened wing-cases, and in having the dorsal abdominal processes bent). (8) Adapted mode of flight. (9) Geographical distribution.

The male abdomen of *hypolitus* is usually described as being a strong or dark yellow (Boisduval (1836), Rothschild (1895), Fickert (1889), Rippon (1906), Jordon (1927), etc.). As



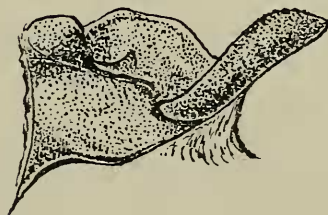
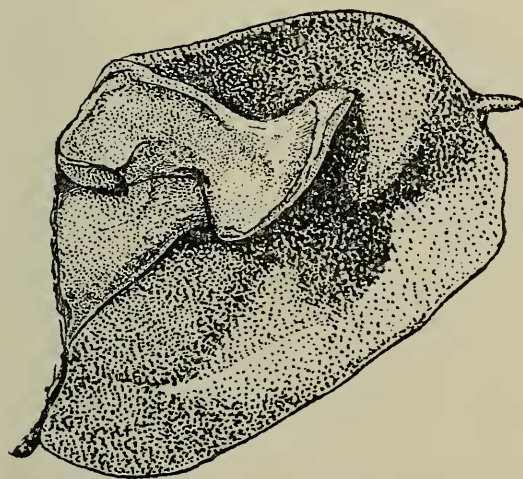
5 mm.

Figure 2a: *R. (T.) hypolitus hypolitus* ♂ genitalia. Right clasper. Amboyna. Coll. P. Blandin. No. PB0102.



5 mm.

Figure 2b: *R. (T.) hypolitus cellularis* ♂ genitalia. Right clasper. South Celebes. Coll. P. Blandin. No. PB0103.



5 mm.

Figure 2(c): *R. (T.) hypolitus cellularis* ♂ genitalia.

Right clasper, oblique ventral view of harp.

S. Macassar distr., Celebes. Coll. J. Haugum. No. 8.

far as we know, only Staudinger (1888) and Zeuner (1943), have described it correctly as being "striking reddish-orange coloured on segments 3, 4, 6 and 7". The colour is, in fact, orange dorsally, but yellow laterally, becoming whitish ventrally in the fresh specimens examined by us (Macassar distr. 1973-74), but is often a darker, reddish-orange dorsally in museum material. Whether this latter coloration is a natural individual variation, or owing to alteration in the pigments due to age we are at present unable to say. We hope to discuss the significance of the modified black abdominal pattern in the male of *Ripponia* and *Troides* at a later date.

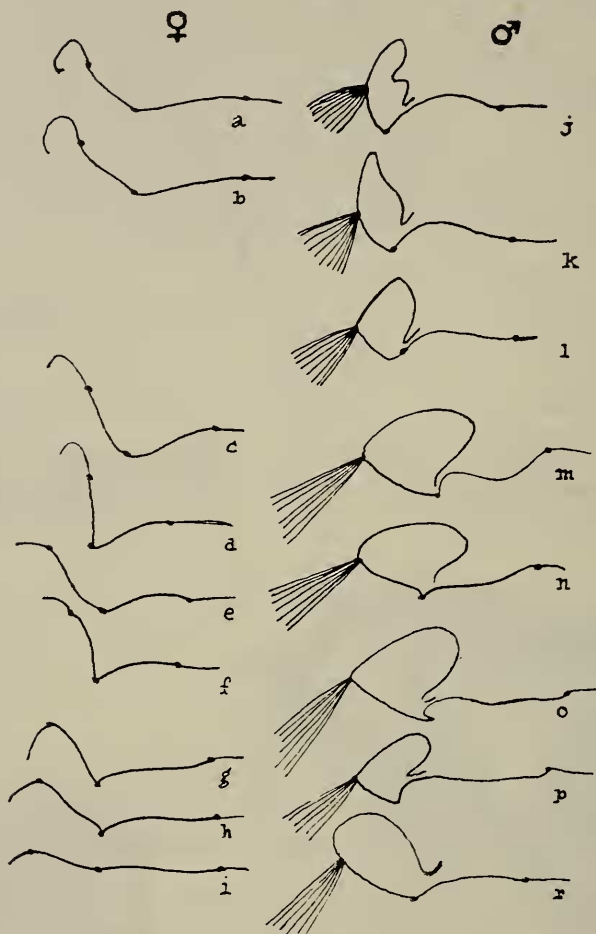


Figure 3: Dorsal fold of ♂ HW, and dorsal margin of ♀ HW in *hypolitus*, *Trogonoptera* and *Troides*. Section-cut through central part.

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Ripponia</i> | <ul style="list-style-type: none"> { a. <i>hypolitus</i> ♀, Celebes { b. <i>hypolitus</i> ♀, Celebes | <i>Ripponia</i> | <ul style="list-style-type: none"> { j. <i>hypolitus</i> ♂, Celebes { k. <i>hypolitus</i> ♂, Ambon { l. <i>hypolitus</i> ♂, Celebes |
| | | | |
| <ul style="list-style-type: none"> { c. <i>trojana</i> ♀, Palawan { d. <i>trojana</i> ♀, Palawan { e. <i>brookiana albescens</i> ♀, Malay Peinsula { f. <i>brookiana albescens</i> ♀, Malay Peninsula { g. <i>amphrysus ruficollis</i> ♀, Perak | <ul style="list-style-type: none"> { o. <i>mirandus mirandus</i> ♂, Sabah { p. <i>darsius</i> ♂, Celebes { r. <i>oblongomaculatus papuensis</i> ♂, New Guinea | | |
| | | <i>Troides</i> | <ul style="list-style-type: none"> { h. <i>amphrysus ruficollis</i> ♀, Perak { i. <i>haliphon haliphon</i> ♀, Celebes |

The scent-organ or anal pouch of the male hindwing in *hypolitus* is of the type generally found in *Troides*. Little attention has been given to this structure (which was described by Rippon in 1906), except by Zeuner (1943). The dorsal fold, covering the scent-scales within the anal pouch, is complete, that is recurved over the wing, the outermost portion is abruptly recurved so to close tightly in position when the scent-organ is not operated. In some specimens the outer portion of the folded-over flap has a double curve and recurve at the edge. The edge of the flap is not interlocking with a fold or groove in the wing as in *Trogonoptera*, nor does it have the narrow groove in the wing-membrane close to vein 1 which is found in at least some *Troides*: in *hypolitus* a tight enclosure of the scent is provided by that part of the membrane which supports vein 1 being angularly reset (or curved) and bent, this structure forming a minute step in the plane of the wing (it appears that this structure is somewhat individually variable in *hypolitus*, as the "step" is angular in some males, while a regular curve is found in others, the latter condition being illustrated in the figure. It is often difficult to establish the normal position of the various dorsal folds and anal pouches in the Birdwings from examination of museum material, as these structures are frequently somewhat distorted in shape during the setting and drying processes, the above considerations being therefore based in all essentials upon recent, unset material). The actual angle, at which the fold itself is set, varies from that of *Troides*. The enclosure formed by the fold is somewhat narrower and higher than in *Troides*. The anal brush is long and dark, nearly black. Female *hypolitus* with a downturned (negative) "fold" at dorsal margin of hindwing, this fold is sometimes recurved and is unlike that of *Trogonoptera*. The actual margin of this area is constantly slightly recurved in the specimens examined for this character: this modification is not present in any *Trogonoptera* females examined for this character, but may be present to a less pronounced degree in some *Troides*, though generally absent.

The scaling of the male of *R. (T.) hypolitus*

The black scales of the disc of forewing have a dark greenish gloss: they are in shape short, ovate, non-dentated and blunt, intermingled with a smaller quantity of similarly shaped but dentate scales. In the marginal areas of wing only non-dentate scales present Jordan (1895) found that these scales are much less denticulate than those of *Troides*, and this agrees well with our observations. Black scales on the disc of forewing, inside cell, are ranging from ovoid, elongated shapes to broad ones with irregular, blunt dentations. The greyish-white scales of the pale vein-stripes of the forewing underside are ovoid, prominently tri-dentate, and larger than the scales of the upper-side: intermingled with these scales are some ovoid or irregular, transparent scales without pigmentation. These scales are prominently irregular in shape: a short "knob" is present on their stalk. The yellow scales of the hindwing ovoid, often widest

at base: the stalk is *reset* in the scale, not protruding basally. The plain white scales of the disc of the hindwing underside are bi- or tridentated, similar in shape to the greyish-white scales of the forewing vein-stripes, but smaller. In the area next to the dorsal fold the scales are either tridentate, or larger, bidentate. The scales of the dorsal fold (taken outside the upper edge) ovoid, bidentate, or irregularly tri- quadri- or multi-dentate, often asymmetrical in shape, with the teeth at apices long. The scales of the underside of dorsal fold prominently bidentate, variable in shape, often very slim with parallel sides, or being widest near base. Jordan, in the supplementary notes to Rothschild's Revision, remarks that the scales on the underside of the fold are broadest towards the base and irregularly produced at the apex in two very long teeth in *hypolitus* and in *Ornithoptera*, while these scales in *Troides amphrysus* and *T. helena* have partly three long teeth: in *Trogonoptera* most of these scales have three or four teeth. The apical teeth of the bidentate scales of the dorsal fold referred to above, are in some specimens extremely long and pointed: those scales bordering the edge of the fold very narrow. This appears to confirm Jordan's observations on the differences which are evident in the scaling of the dorsal area of the male hindwing in these related genera. Our observations also indicate that the differences in scaling are fairly constant, and may thus serve as a general aid in the classification of the Troidini genera.

The black scales of the *hypolitus* abdomen narrow, irregularly prolonged, ovoid, and often elongated and nearly hair-like with a smooth-tapering apex. Orange scales of abdomen irregularly ovoid, narrow, often more curved than the preceding, or irregularly bent. The tip of the black hairs of the dorsal fringe irregular.

Dimorphism in *R. (T.) hypolitus sulaensis* Staudinger, 1895

The geographical distribution of the little known subspecies *sulaensis* Staudinger comprises the islands of the Sula or Sula Group: Sula Besi (Sula Sanana), Sula Mangoli, and probably Talibabu, although we have not seen a specimen from that island. Although the subspecies *sulaensis* is located geographically between the other subspecies of *hypolitus*, it is not intermediate in character. It is, apart from the consistent black abdominal markings, chiefly characterised by being dark and distinctly patterned in both sexes: in the male, by a very dentate hindwing, a pale suffusion along the forewing veins, and by the presence of yellow scaling bordering the discal veins, and a presence of such scaling *within the cell* on the hindwing underside. According to Staudinger, all whitish areas of the hindwing underside being more or less strongly yellow "flushed". This yellow scaling inside the hindwing cell has a strong tendency to follow the pseudoneuri.

It has been considered that the orange colour of the male abdomen is a consistent character in this species. There is, however, a tendency towards a darker, more reddish coloration in *hypolitus antiopa* and the nominate *hypolitus* as referred to

earlier. In subspecies *sulaensis*, a rare form occurs in which the orange colour is entirely replaced by a clear yellow, and a somewhat more frequent form in which the orange is entirely replaced by a greyish white colour. This modification is also accompanied by modification of scaling on the wings in the latter form.

Form **alboabdominalis** nov. ♂

Abdomen with orange colour replaced by creamy or greyish white. The yellow scaling on the disc of hindwing underside entirely absent. This form is thus lacking one of the most prominent characters of the subspecies to which it belongs. There is a short series in coll. Brit. Mus. (Nat. Hist.). Its status is unknown, but it may be found to be above that of an individual variation. Sula Besi and Sula Mangoli: Ufola.

Form **flavoabdominalis** nov. ♂

Abdomen yellow. Stands intermediated between the nominate f. *sulaensis* and the above. For the sake of convenience we apply a name to the single specimen known in which the abdomen is yellow. Status unknown. One male in coll. Brit. Mus. (Nat. Hist.).

For some time we were inclined to think it impossible to match any female specimens with the interesting forms enlisted above due to their variability. However, Mr. T. G. Howarth of the British Museum (Nat. Hist.) now informs us that it does seem possible to recognise the corresponding forms of this sex, which he enlists as follows: *flavoabdominalis* female: abdomen ochraceous to bistre. One specimen known. *Alboabdominalis* female: abdomen plain silvery grey, i.e. as in nominate *hypolitus* except for a complete absence of yellow scales. It furthermore differs from nominate *hypolitus* in having a paler and less vivid colour of the yellow areas of the hindwing. Locality as for the male form *alboabdominalis*.

On the Status of *R. (T.) hypolitus cellularis* Roths., 1895 (*celebensis* Stgr., 1895)

While preparing a Monograph of the Birdwing Butterflies we realised the need for a strict view of the numerous subspecies and forms hitherto described, because many of these have been named unnecessarily. We accordingly found it convenient to readapt the term *local form* (f. loc.) for designating local populations of a species or subspecies which in some way differ from the taxa to which it belongs, but which stands below a subspecific level. Such forms are well known, especially in the *Ornithoptera*, and may, at least in some cases, be considered potential subspecies. It is in this way possible to sink a dubious subspecific name, but if one prefers so, to retain the name at the same time with the suffix f. loc.

We find in *hypolitus cellularis* Rothschild such local populations which differ in no important way from the nominate *hypolitus* (Cramer) of Ceram, nor from the sometimes darker *hypolitus* from Ambon (& Buru?). Those who may wish to apply a polynominal nomenclature may hereafter refer to the Celebean *hypolitus* as *hypolitus hypolitus* f. loc. *cellularis* Rothschild (Celebes). The whitish scales of the pale vein-stripes of the

forewing of both sexes are stated to be only sparingly present in the Celebean *hypolitus*. This is an individually variable character, and not valid for the diagnosis of a geographical subspecies. There are no appreciable differences in the males of the various populations, and Rothschild himself admitted that the males of nominate *hypolitus* and those of *cellularis* are practically indistinguishable. Some slight differences in the variable females is worth noticing: Celebean females tend to have less extended yellow scaling in the lower wing-areas of the upperside hindwing: lower part of the hindwing being purer white, dusted with dark scales, resulting in a grey appearance. In Ceram and Ambon females this area is often dusted with yellowish. This character is also individually variable. Celebean females are on average slightly smaller, and tend to have a darker and less yellow abdomen. Most markings are equally variable in Celebean and Ambon/Ceram specimens, and examples from either place, having no data of origin, may well be virtually impossible to identify. However, markings in which a somewhat more stable tendency of difference between the Celebean and Ambon/Ceram females, are evident in the abdominal patterns. In the abdomen of the female *hypolitus* there are two lateral rows of markings. In the females of *hypolitus* from Celebes there is a tendency towards diffusion of the upper row of spots, which are at the same time slightly enlarged. The Ceram females have the spots of the upper row small, but distinctly defined. The lower row of spots then, consists of spot which are small in the Celebean specimens but enlarged in Ambon/Ceram examples. However, none of the above enumerated differences are found in every specimen, and they do not support the hitherto subspecific status of the Celebean populations in our opinion. We therefore place the name *cellularis* Rothschild as a synonym of *hypolitus* (Cramer).

With regard to the geographical distribution of *hypolitus* (Cramer), the authors would welcome any supplementary information which may be forthcoming on its occurrence, especially on the islands Baru (from which one female specimen is recorded), Peleng and Banggai (between Celebes and the Sula group) and from the Sangihe-Talaut group, north of Celebes. It is likely that the records from these northern islands misled D'Abrera (1971), as he states that the distribution of *hypolitus* includes the Philippines. Notes or requests should be addressed to the first author.

Summary

The present status of *Troides hypolitus* (Cramer) is discussed: its standing as a species of the genus *Troides* is found unsatisfactory considering its distinct characters, some of which point to a relation with *Trogonoptera*. The male genitalia of *hypolitus* is found to be very distinct, having little or no similarity to the genitalia of *Troides*, being vaguely reminiscent of *Trogonoptera*. This species is therefore elevated to a generic rank, and the name *Ripponia* is proposed for the new genus. Various characters of *hypolitus* are discussed, and importance

is placed upon generic differentiation in scaling. *R. (T.) hypolitus cellularis* Rothschild is placed as a synonym of *hypolitus* (Cramer), and two new forms of *hypolitus sulaensis* are described.

Acknowledgements

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First Records of Dragonflies (Odonata: Anisoptera) from Tripura (India)

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The present note is based on a collection of specimens of dragonflies made by one of us (G.C.S.) in Agartala (Lat. 23° 15'N. and Long. 91° 15'E.) of Tripura, a state in Eastern India, during a short private visit in November 1970. Forty-two specimens belonging to seven species spread in five genera were collected. Though all the species are known to be cosmopolitan in distribution, it was considered worthwhile to publish a short note on this material since this is the first report on Odonata from Tripura.

All the species recorded here belong to the family Libellulidae, spread in four of its subfamilies. Five are old world species and one is known from both old and new worlds.

SYSTEMATIC ACCOUNT

Orthetrum sabina (Drury). 10♂♂, 3♀♀, Agartala, 6.xi.1970, coll. G. C. Sen. Recorded from almost all parts of India; also from Nepal, Somaliland, Mesopotamia, Persia to Samoa and Australia.

Orthetrum pruinatum neglectum (Rambur). 3♂♂, Agartala, 6.xi.1970, coll. G. C. Sen. The species is common in the plains and hills of India and extends to Tibet, Indochina and Hongkong.